

**SUSTAINED NATURAL APOPHYSEAL GLIDE OVER  
SUSTAINED NATURAL APOPHYSEAL GLIDE WITH  
CHIN TUCK EXERCISE IN CERVICOGENIC HEADACHE**

**A dissertation submitted in partial fulfillment of the requirement for the  
degree of**

**MASTER OF PHYSIOTHERAPY**

**ELECTIVE – ADVANCED PT IN ORTHOPAEDICS**



**(Reg. No. 27091905)**

**RVS COLLEGE OF PHYSIOTHERAPY**

*(Affiliated to the Tamil Nadu Dr. M.G.R Medical University, Chennai – 32)*

**SULUR, COIMBATORE – 641 402  
TAMIL NADU  
INDIA**

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CHIN TUCK EXERCISE IN CERVICOGENIC HEADACHE**

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**SUBMITTED IN THE PARTIAL FULFILLMENT OF THE REQUIREMENT FOR  
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DR. M.G.R. MEDICAL UNIVERSITY,  
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(APRIL 2011)**

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**1.INTERNAL EXAMINER**

**2. EXTERNAL EXAMINER**

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## **DECLARATION**

I hereby declare and present my project work entitled “**STUDY ON EFFECTIVENESS OF SUSTAINED NATURAL APOPHYSEAL GLIDE OVER SUSTAINED NATURAL APOPHYSEAL GLIDE WITH CHIN TUCK EXERCISE IN CERVICOGENIC HEADACHE**” The outcome of the original research work undertaken and carried out by me, under the guidance of Professor **Mr. B.KANNABIRAN, M.P.T., (Ph.D.)**, RVS COLLEGE OF PHYSIOTHERAPY, Sulur, Coimbatore.

I also declare that the material of this project work has not formed in any way the basis for the award of any other degree previously from **The Tamil Nadu Dr. M.G.R Medical University**.

SIGNATURE

## ACKNOWLEDGEMENT

I give my thanks to God almighty for providing me the wisdom and knowledge to complete my study successfully.

I acknowledge my sincere thanks to **CHAIRMAN and SECRETARY OF RVS EDUCATIONAL TRUST**, Sulur, Coimbatore for providing me an opportunity to do this project.

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I offer my grateful thanks for all the staff members of RVS Hospital for extending support at the time of data collection.

I also thank my friends for their co-operation in completion of this project.

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## **1.1 INTRODUCTION**

Cervicogenic headache is relatively common and still controversial form of headache. Cervicogenic headache has been classified by International Headache Society and accounts for 15% to 20% of all chronic and recurrent headaches. The estimated prevalence of disorder ranging from 0.7% to 13.8%. The individuals with chronic cervicogenic headache experience considerable restriction of daily function, limitation of social participation, and emotional distress. In addition, these individuals report a lower quality of life than other individuals.

Cervicogenic head is a syndrome characterized by chronic hemi cranial pain that is referred to the head from either bony structure or soft tissues of the neck. Sensory nerve fibers from the descending tract of trigeminal nerve are believed to interact with sensory fibers from the upper cervical roots; this convergence allows the bidirectional referral of painful sensations between the neck and trigeminal sensory receptive fields of the face and head. A functional convergence of sensory and motor fibers in the spinal accessory nerve and upper cervical nerve roots ultimately coverage with the descending tract of the trigeminal nerve might also be responsible for cervical pain.

Cervical headache is a ‘side-locked’ or unilateral fixed headache characterized by non throbbing pain that starts in the neck and spread to ipsilateral occulo- fronto temporal area. This pain may be provoked by active neck movement, passive neck positioning especially in extension or extension with rotation toward the side of pain or an applying digital pressure to involved facet regions or over ipsilateral greater

occipital nerve. Muscular trigger points are usually found in the suboccipital, cervical, and shoulder musculature, and these trigger points can also refer pain to the head when manually or physically stimulated.

Diagnostic imaging such as radiography, magnetic resonance imaging and computerized tomography cannot confirm the diagnosis of cervicogenic headache but can lend support to its diagnosis. One study reported no demonstrable difference in the appearance of cervical spine structures on MRI scans when 24 patients with clinical features of cervicogenic headache were compared with 20 control subjects. Cervical disc bulging was reported equally in both groups.

A laboratory evaluation may be necessary to search for systemic diseases that may adversely affect muscles, bones, or joints (rheumatoid arthritis, systemic lupus erythematosus, thyroid or parathyroid disorders, primary muscle disease, etc).

Flexion rotation test measures movement at atlanto-axial joint, which has been shown to be a likely source of pain in patients with cervicogenic headache. Individuals who have been diagnosed with cervicogenic headache show values ranging from 20 – 28 degrees.

Flexion rotation test is a stable and repeatable method of cervical spine examination. It is reliable and has low measurement error if performed by an experienced clinician (Hall T, et al., 2010).

Manipulation has frequently been used for the management of back and neck complaints and is thought to

(1) Free motion segments that have undergone disproportional displacement (or) are felt to be hypomobile

(2) cause muscle relaxation.

These mechanisms are thought to be associated with distribution of abnormal stresses within the joint, resulting in pain, restriction of motion and potential inflammation.

Patient with cervicogenic headache will often have altered neck posture and restricted range of motion.

Sustained Natural apophyseal Glide and chin-tuck exercise are the interventions used to treat the cervicogenic headache in this study.

Sustained Natural apophyseal Glide is the mobilization with active movement followed by passive overpressure which should be applied to further increase the movement.

Chin-tucks are the postural exercises should perform early to prevent stiffness from developing and to ensure the neck is functioning correctly.

## **1.2 AIM AND NEED OF THE STUDY:**

- (1) To find the effectiveness of sustained natural apophyseal glide in Cervicogenic headache
- (2) To find the effectiveness of sustained natural apophyseal glide with chin tuck exercise in cervicogenic headache.
- (3) To compare the effectiveness of sustained natural apophyseal glide over sustained natural apophyseal glide with chin tuck exercise in cervicogenic headache.

Cervicogenic headache is common and still controversial form of headache. The result of this study will help the physiotherapist to select the appropriate treatment procedure for better rehabilitation of these patients

## **1.3 STATEMENT OF THE STUDY:**

A comparative study on “Effectiveness of sustained natural apophyseal glide over sustained natural apophyseal glide with chin tuck exercise in cervicogenic headache”

## **1.4 HYPOTHESIS:**

### **Null hypothesis**

There is no difference between the effectiveness of sustained natural apophyseal glide over sustained natural apophyseal glide with chin tuck exercise in cervicogenic headache.

### **Alternate hypothesis**

There is significant difference between the effectiveness of sustained natural apophyseal glide over sustained natural apophyseal glide with chin tuck exercise in cervicogenic headache.

## **1.5 OPERATIONAL DEFINITION:**

### **Cervicogenic headache**

- The world cervicogenic headache society (1998) defines, cervicogenic headache as, “Referred pain perceived in primary nociceptive source in the musculoskeletal tissue innervated by cervical nerves”. These structures may include muscles, facets, joints, capsules, and ligaments of upper three cervical segments, nerves, durameter, spinal cord or vertebral artery. Cervical joints have been recognized as a source of headache.

### **Pain**

- International society of association for study of pain defines pain as, unpleasant sensory and emotional experience due to actual or potential tissue damage or described in terms of damage (Merskey and Bogduk, 1994)
- An unpleasant sensation that can range from mild, localized discomfort to agony.

### **Range of motion**

- The full motion possible to the joint is called the range of motion.

## **2. REVIEW OF LITERATURE**

**Brent Harper (2009)** made a study on implementing evidence based medicine for cervicogenic headache and determined the efficiency of spinal manipulation on patients with cervicogenic headache in relation to quality of life, intensity and frequency of cervicogenic headache and articular mobility(range of motion).

**Toby hall et al (2007)** made a study on efficacy of a c1-c2 self-sustained natural apophyseal glide (SNAG) in the management of cervicogenic headache on subjects with outcome measures of Flexion Rotation range and headache index questionnaire and reported the efficacy of SNAG in the management of individuals with cervicogenic headache.

**Ogince et al (2007)** made a study and reported that cervical flexion-rotation test has diagnostic validity in c1 /2-related cervicogenic headache.

**Fernandez-des-las-penas C (2006)** made a study on methodological quality or randomized controlled trial of spinal manipulation and mobilization in patient tension type headache, migraine and cervicogenic headache and reported the effectiveness of spinal manipulation and mobilization in headache.

**Rodeghero et al (2006)** made a study on potential role of manual physical therapy and specific exercise intervention in subject with cervicogenic headache, the



patient demonstrated improvement with a total of seven treatment sessions, outcome measure used were Neck pain disability index score and reported that these interventions were effective in quickly improving function and impairments in patients with cervicogenic headache.

**Luke Eldrige et al (2005)** made a study on the effectiveness of cervical spine manipulation and prescribed exercise in reduction of cervicogenic headache in subject with a sixteen year history of cervicogenic headache, the study consisted of a three week base line data collection phase, a 3 week osteopathic manipulative treatment phase and a 3 week home based exercise phase, outcome measures include visual analogue scale and headache diary which indicated a reduction in both intensity of headache pain and frequency.

**Mc Donnel et al (2005)** conducted a study on intervention approach consisting of a specific exercise program and modification of postural alignment for an individual with cervicogenic headache and reported the successfulness in relieving headache and improving function of the patient.

**David M.Biondi et al (2005)** conducted a study and reported the effectiveness of therapeutic exercise and manipulative treatment for cervicogenic headache which was not substantially affected by age, gender of headache chronicity in patients with moderate to severe pain intensity.

**Hall T and Robinson K (2004)** made a study of comparative measurement of flexion-rotation test and active cervical mobility in cervicogenic headache and reported that subjects with cervicogenic headache have an average of 17° less rotation toward the headache side in flexion rotation test.

**Peterson (2003)** investigated the role of manipulation and exercise over 8 week period in cervicogenic headache patient and reported a significant improvement in headache parameter at the conclusion of trial.

**Jull et al (2002)** conducted a study on randomized controlled trial of exercise and manipulative therapy for cervicogenic headache and reported that manipulative therapy and exercise can reduce the symptoms of cervicogenic headache and manipulation plus exercise was found to be superior to exercise alone.

**Sizer et al (2002)** published a retrospective case report of 20 year history of cervicogenic headache patient, the patient received a combined program of manipulation and exercise for a total of 24 treatments over 3 month period and reported a significant improvement in headache parameters after the patient received the combined treatment program of manipulation and exercise.

**Whorton and Kegerreis (2000)** made a study on manual therapy and exercise in the treatment of cervicogenic headache patient data was collected at a 6 months

follow up, and five of 6 subjects reported a statistically significant improvement with treatment

**Watson and Trott et al. (1999)** performed quasi experimental cross sectional controlled diagnostic trial and identified the deep cervical flexor muscle group as dysfunction in cervicogenic headache patients.

**Mulligan (1999)** described interventions including “SNAGS” technique find useful in restoring a loss of cervical  $\frac{1}{2}$  rotations which is often associated with headache.

**Nilsson et al(1995)** conducted a randomized control trial of subjects comparing manipulation of cervical spine with soft tissue massage and sham laser treatment .It fail to reach the statistical significance, again in 1997,with additional subjects performed the same trial as in first study and reported a significant decrease in headache intensity of a group received manipulation.

**Schoense et al (1995)** conducted a study of the effect of mobilization on cervical headache, volunteers were medically cleared to participate, and these subjects received 9 to 11 sessions of joint mobilization and reported a significant decrease in headache frequency, intensity and duration.

**Boline et al. (1995)** conducted a study of spinal manipulation Vs amitriptylline for the treatment of chronic headache and reported spinal manipulation has long term beneficial effect than medication.

**Nilsson (1995)** conducted a study on prevalence of cervicogenic headache in a random population sample of 20-59 year olds and reported that cervicogenic headache appears to be relatively common form of headache similar to migraine in prevalence.

**Karen Beeton and Gwendolen Jull (1994)** investigated a program of manipulation and exercise on cervicogenic headache patient and reported a significant improvement in headache parameter

### **3. RESEARCH DESIGN AND METHODOLOGY**

#### **3.1 Study design**

The research design of this study is experimental in nature, done on different subjects with pre-test and post -test settings.

#### **3.2 Settings**

The study was conducted in RVS hospital.

#### **3.3 Criteria for selection**

#### **3.4 Inclusion criteria**

- Headache of cervical origin
- Age group of 20- 59 years
- Both sexes
- Positive flexion -rotation test

#### **3.5 Exclusion criteria**

- Headache not of cervical origin
- Headache with autonomic Involvement, dizziness (or) visual disturbance
- congenital condition of cervical spine
- Contra indication to manipulative therapy

### **3.6 Sample population**

30 subject and 15 in each groups.

### **3.7 Method of selection**

Random sampling technique

### **3.8 VARIABLES USED IN THE STUDY**

#### **Independent variable**

- Sustained natural apophyseal glide
- Chin tuck exercise

#### **Dependent variable**

- Pain
- Range of motion

### 3.9 METHODOLOGY

Thirty samples selected from the population were divided into two equal group. The procedure was explained to subject. Both the group underwent a pre test measurement of pain intensity and range of motion.

- Group A was treated with sustained natural apophyseal joint glide
- Group B was treated with sustained natural apophyseal joint glide along with chin tuck exercise for 6 weeks.

Hence both groups were treated and after 6 weeks measured pain by visual analogue scale and range of motion measured by goniometer.

#### **Technique**

##### **1. Sustained natural apophyseal glide**

**Position of patient:** sitting

**Position of Therapist:** standing behind the patient

The patient was instructed to sit comfortably on a stool or chair. Therapists stand behind the patient. His or her head was cradled between therapist body and right forearm if therapist stands on patient's right side. The right index, middle and ring fingers wrap around the base of the occiput and the middle phalanx of the little finger lies over the spinous process of C2 the lateral border of the left thenar eminence lies over the right little finger. Pressure was applied in ventral direction on the spinous



process of cervical 2 while the skull remains still due to the control of therapist right forearm. The really gentle moving force to do this comes from therapist left arm via the thenar eminence over the little finger on the spine of cx 2. The second vertebra moves forward on the first then the first vertebra moves forward on the base of the skull .this movement should continue until the end range is felt and this position was maintained for at least 10 seconds, this should be repeated for 6 to 10 times. Then teach the patient about self-headache sustained natural apophyseal glide by place the hand towel around the spinous process of c2 and ask the patient to secure it with the hands and ask the patient to take his or her head backward without tilting, ask the patient maintain for at least 10 seconds and repeat it for 6 to 10 times.

Mechanism by which the-C1-C2 sustained natural apophyseal glide may have reduced headache symptoms is by the neuromodulation effect of joint mobilization. In the gate control theory, stimulation of mechanoreceptors within the joint capsule and surrounding tissues causes an inhibition of pain at the spinal cord; In addition, descending pain-inhibitory systems may be activated, mediated by areas such as the periaqueductal gray of the midbrain. The end range positioning in rotation with the CI-C2 sustained natural apophyseal glide may engage these inhibitory systems and reduce pain.

Increase in cervical rotation range on the functional rotation test is that the CI-C2 sustained natural apophyseal glide decreased joint stiffness. Mobilization is thought to break down adhesions and stretch surrounding tissues. That the improvement in rotation range was immediate suggests that the effect of the CI-C2

sustained natural apophyseal glide technique is more likely related to a neurophysiological change in pain modulation rather than an effect on joint stiffness.

### **Basic Principles**

- Treatment plane lying across the concave articular surface
- Application of accessory movement and patient generated active movements.
- During assessment the therapist will identify one or more comparable signs as described by Maitland. These signs may be a loss of joint movement, pain associated with movement, or pain associated with specific functional activities.
- Passive accessory joint mobilization is applied following the principles of kaltenborn (i.e., parallel or perpendicular to the joint plane). This accessory glide must itself be pain free.
- The therapist must continuously monitor the patient's reaction to ensure no pain is recreated. Utilizing the knowledge of joint arthrology, a well-developed sense of tissue tension and clinical reasoning, the therapist investigates various combinations of parallel or perpendicular glides to find the correct treatment plane and .grade of movement.
- While sustaining the accessory glide, the patient is requested to perform the comparable sign. The comparable sign should now be significantly improved (i.e., increased range of motion and a significantly decreased or better yet, absence of the original pain).

- Failure to improve the comparable sign would indicate that the therapist has not found the correct contact point, treatment plane, grade or direction of mobilisation, spinal segment or that the technique is not indicated.
- The previously restricted and/or painful motion or activity is repeated by the patient while the therapist continues to maintain the appropriate accessory glide. Further gains are expected with repetition during a treatment session typically further gains may be realised through the application of passive overpressure at the end of available range. It is expected that this overpressure is again, pain-free.
- Involving three sets of ten repetitions.

## **2. Chin tucks**

**Position of the patient:** sitting or standing

**Position of the therapist:** standing in front of the patient.

Begin this exercise by sitting or standing tall with the patient's back and neck straight, shoulders should be back slightly. Ask the patient to tuck the chin until he/she feel a mild to moderate stretch in neck pain – free, instruct the patient to keep his/ her eyes and nose facing forwards during the movement and hold for 2 seconds, which can be repeated for 10 times provided there is no increase in symptoms.

Postural deviation associated with forward head posture at the atlanto occipital, atlanto axial joints accompanied by flattening of lower cervical spine and possible reversal or flattening of mid cervical lordosis. This position results in joint dysfunction that leads to abnormal afferent information affecting the tonic neck reflex and encouraging the gradual adoption of a forward head position. This cause

compression on craniocervical structures because of compression greater and lesser occipital nerves contribute to perpetuation of headache.

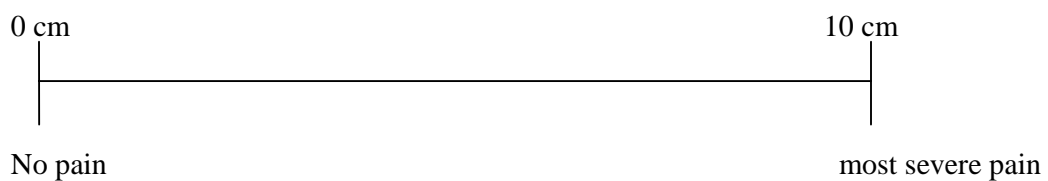
Chin tuck exercise is the postural exercises which corrects the forward head posture there by reducing compression on cranio cervical structure and lessen the headache

### **3.10 MEASURING TOOL**

- Visual analogue scale
- Goniometer

#### **Visual analogue scale**

It consists of 10 cm horizontal line with two end points. One end was labeled as ‘no pain’ and another end labeled as ‘most severe pain’. The patient was required to place mark correspondents to the level of pain intensity that the patient felt.



The distance in cm from the low end of visual analogue scale for patient’s pain was as numerical index of severity of pain.

## **Goniometer**

The term goniometer comes from two Greek words that mean 'angle' and 'measure'. It is an instrument which measures an axis and range of motion. It consists of two straight lengths of plastic material joined by a round section with angle making. One arm is stationary with respect to the central section and the other arm is movable for flexion – rotation range of motion of neck, place the axis of goniometer over the vertex of the head, line up the stationary arm of the goniometer along the stationary line of the body and movable arm parallel to tip of the nose. The ask the patient to bend the head forwards as far as possible without bending the trunk and ask of motion, following the movement with the movable arm of the goniometer, make sure that stationary arm remains straight. Before look at the reading, ensure that arm of goniometer remain aligned with their respective limbs and record the measurement indicated on central section of goniometer.

#### 4. DATA ANALYSIS AND INTERPREATION

The data collected was subjected to paired 't' test individually for group A and group B using formulas.

**Formula 1:**

$$\bar{d} = \sum d/n$$

Where,

d = difference between pretest and posttest values

$\bar{d}$  = is the mean value of d

n = is the number of subjects

**Formula 2:**

$$\text{Standard deviation SD} = \sqrt{\frac{\sum (d - \bar{d})^2}{(n - 1)}}$$

**Formula 3:**

$$\text{Standard Error (S.E)} = \frac{\text{SD}}{\sqrt{n}}$$

$$\text{'t' calculated value} = \frac{\bar{d}}{\text{S.E}}$$

**Formula 4:**

$$t_{cal} = \frac{d}{S.E}$$

Where,  $t_{cal}$  is the  $t$  calculated value

## INDEPENDENT 't' TEST

$$\text{Formula 1: } S = \sqrt{\frac{(n_1-1)s_1^2 + (n_2-1)s_2^2}{n_1+n_2-2}}$$

Where, s is the standard deviation

$n_1$  - is the number of subject in group A

$n_2$  - is the number of subject in group B

$s_1$  - is the standard deviation of group A

$s_2$  is the standard deviation of group B

Formula2

$$S.E = S \sqrt{1/n_1^2 + 1/n_2^2}$$

Where, s - is the standard deviation

S.E. - is the standard error

Formula 3

$$\text{'t' cal} = \frac{\overline{X_1} - \overline{X_2}}{S.E}$$

Where,  $\overline{X_1}$  is the average of difference in values between pretest and post test

$\overline{X_2}$  is the average of difference in values between pretest and post test



**Paired T test [comparison of pretest and posttest mean]**

**TABLE - I**

**1. Pain scale**

<b>Subject</b>	<b>Pain scale</b>	
	<b>Group A</b>	<b>Group B</b>
Pretest mean	7.8	6.8
Posttest mean	4.2	2.86
S.D	0.6546	1.1019

In group A, the mean visual analogue scale pretest value was 7.8 and posttest value was 4.2. For 14 degree of freedom at 0.05 level of significance, the t table value is 2.145 and T calculated value is 13.823, statistically significant

In group B, the mean visual analogue scale pretest value was 6.8 and posttest value was 2.86. For 14 degree of freedom at 0.05 level of significance, the t table value is 2.145 and T calculated value is 21.299, statistically significant

**TABLE- II**

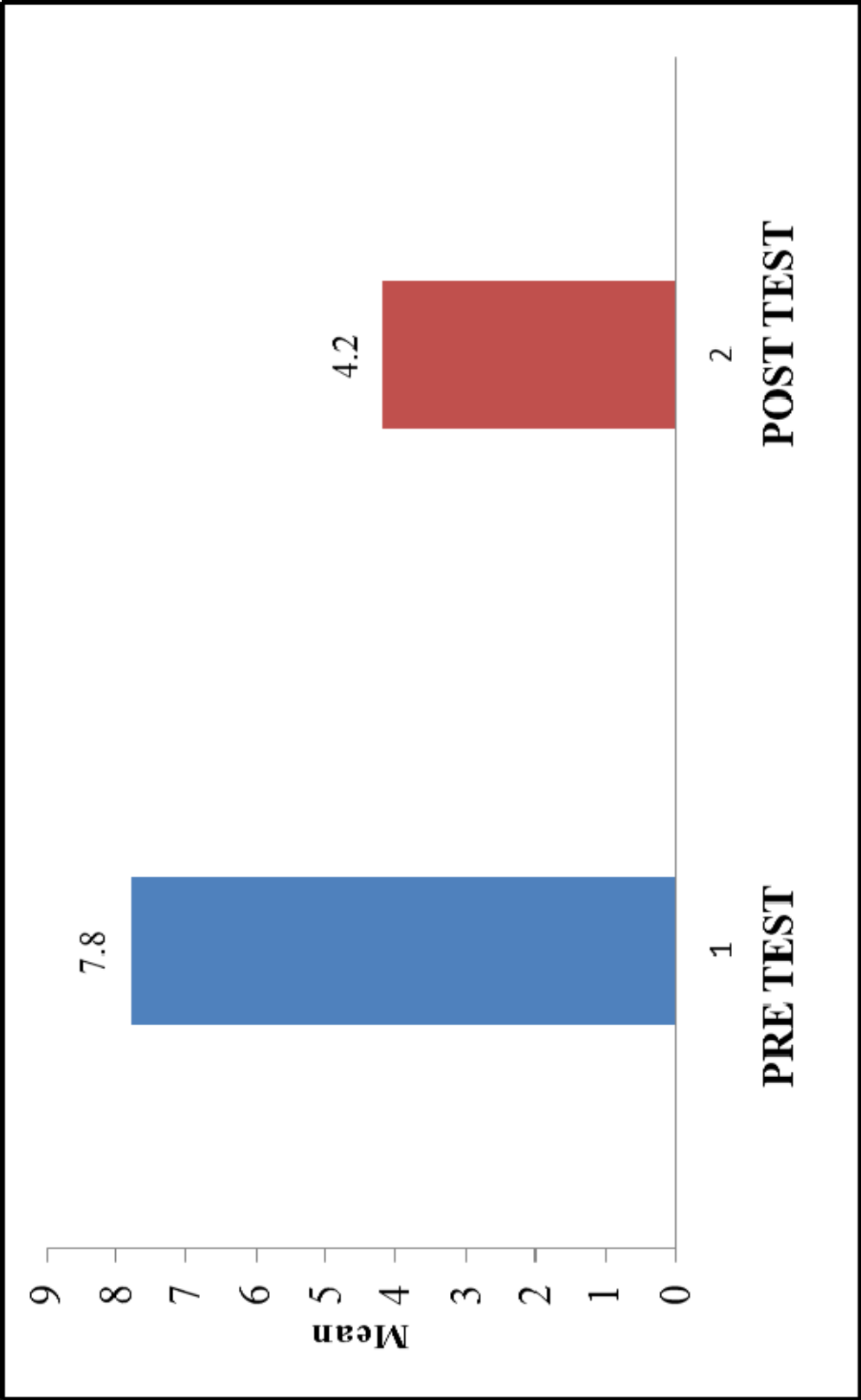
**2. Range of motion**

<b>Subject</b>	<b>Pain scale</b>	
	<b>Group A</b>	<b>Group B</b>
Pretest mean	26.13	25.6
Posttest mean	29.13	28.3
S.D	0.7559	0.5976

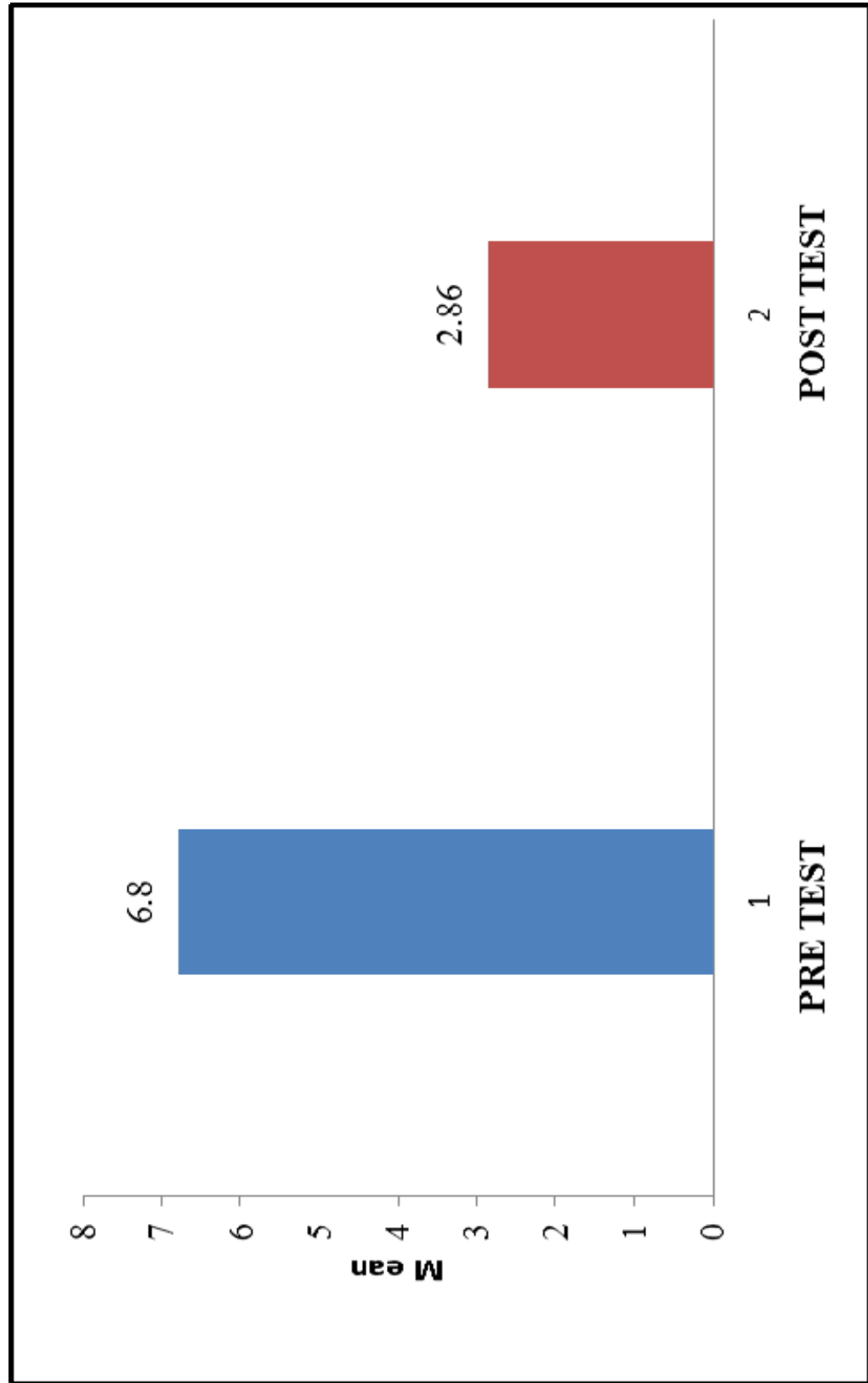
In group A, the mean cervical flexion rotation range of motion pretest value was 26.13 and posttest value was 29.13. For 14 degree of freedom at 0.05 level of significance, the t table value is 2.145 and T calculated value is 15.370, statistically significant

In group B, the mean cervical flexion rotation range of motion pretest value was 25.6 and posttest value was 28.3. For 14 degree of freedom at 0.05 level of significance, the t table value is 2.145 and T calculated value is 17.692, statistically significant

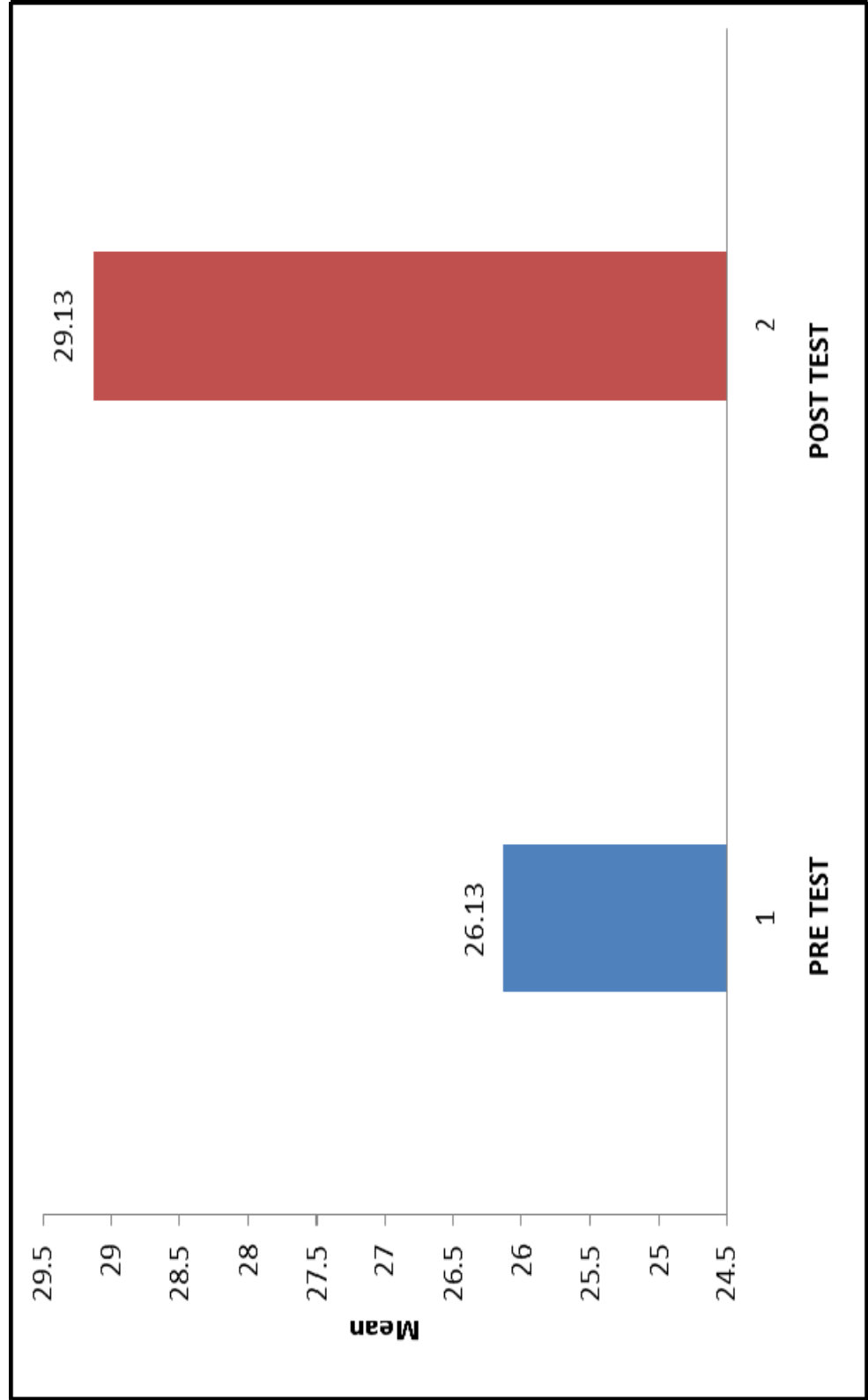
**GRAPH - I**  
**GROUP - A (PAIN)**



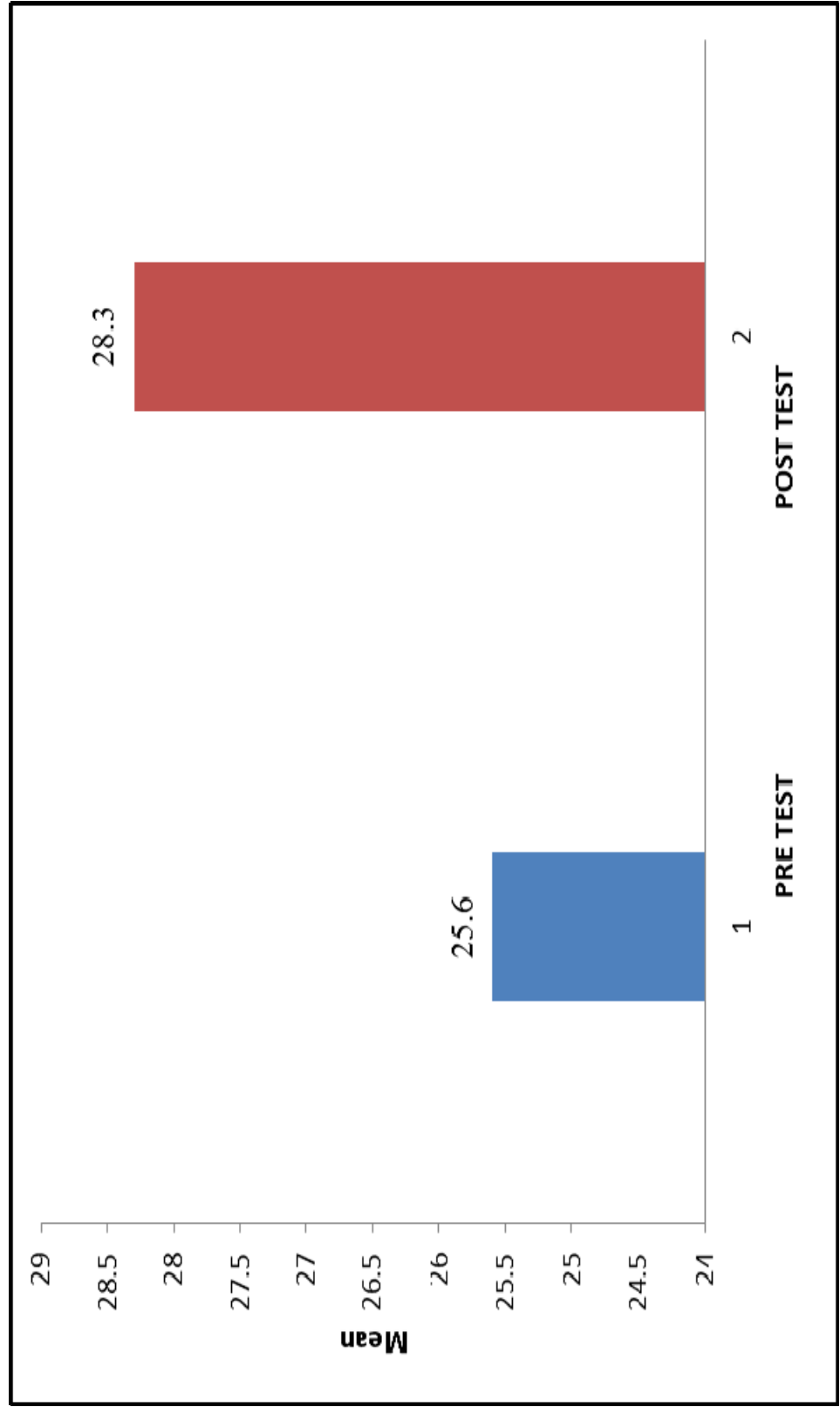
**GRAPH - II**  
**GROUP - B (PAIN)**



**GRAPH - III**  
**GROUP - A (RANGE OF MOTION)**



**GRAPH - IV**  
**GROUP - B (RANGE OF MOTION)**



### Independent 't' test

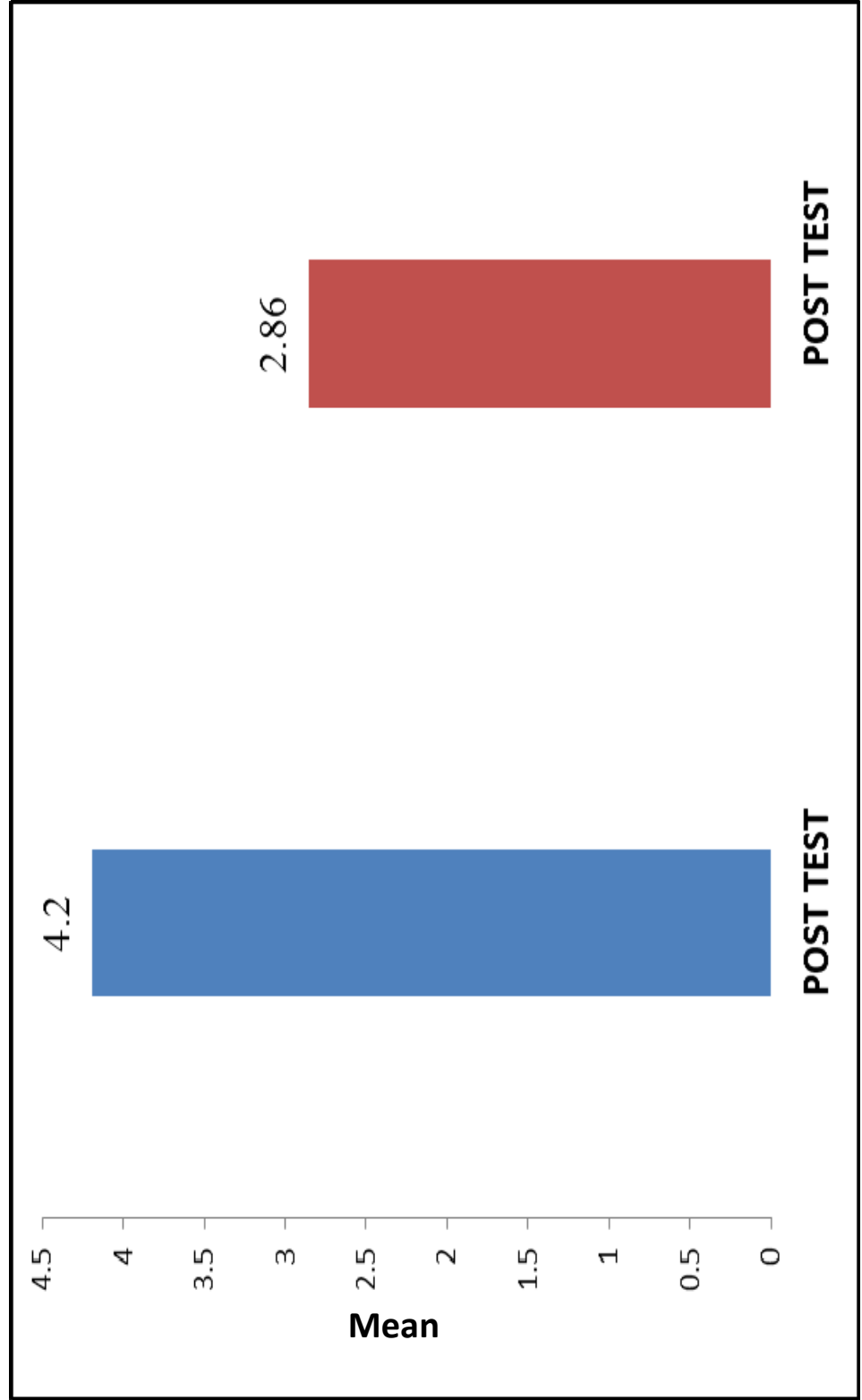
**TABLE- III**

#### **1. Pain**

<b>subject</b>	<b>Sustained natural apophyseal glide Vs sustained natural apophyseal glide with chin tuck exercise</b>	
	<b>Group A</b>	<b>Group B</b>
Posttest mean	4.2	2.86
Independent 't' test	1.0064	

The independent t test value for pain, 1.0064 is respectively for 28 degree of freedom at 0.05 level of significance and critical table value is 2.048, therefore there is no significant difference in both the group

**INDEPENDENT t TEST**  
**GRAPH- V**  
**PAIN (Group A and Group B)**



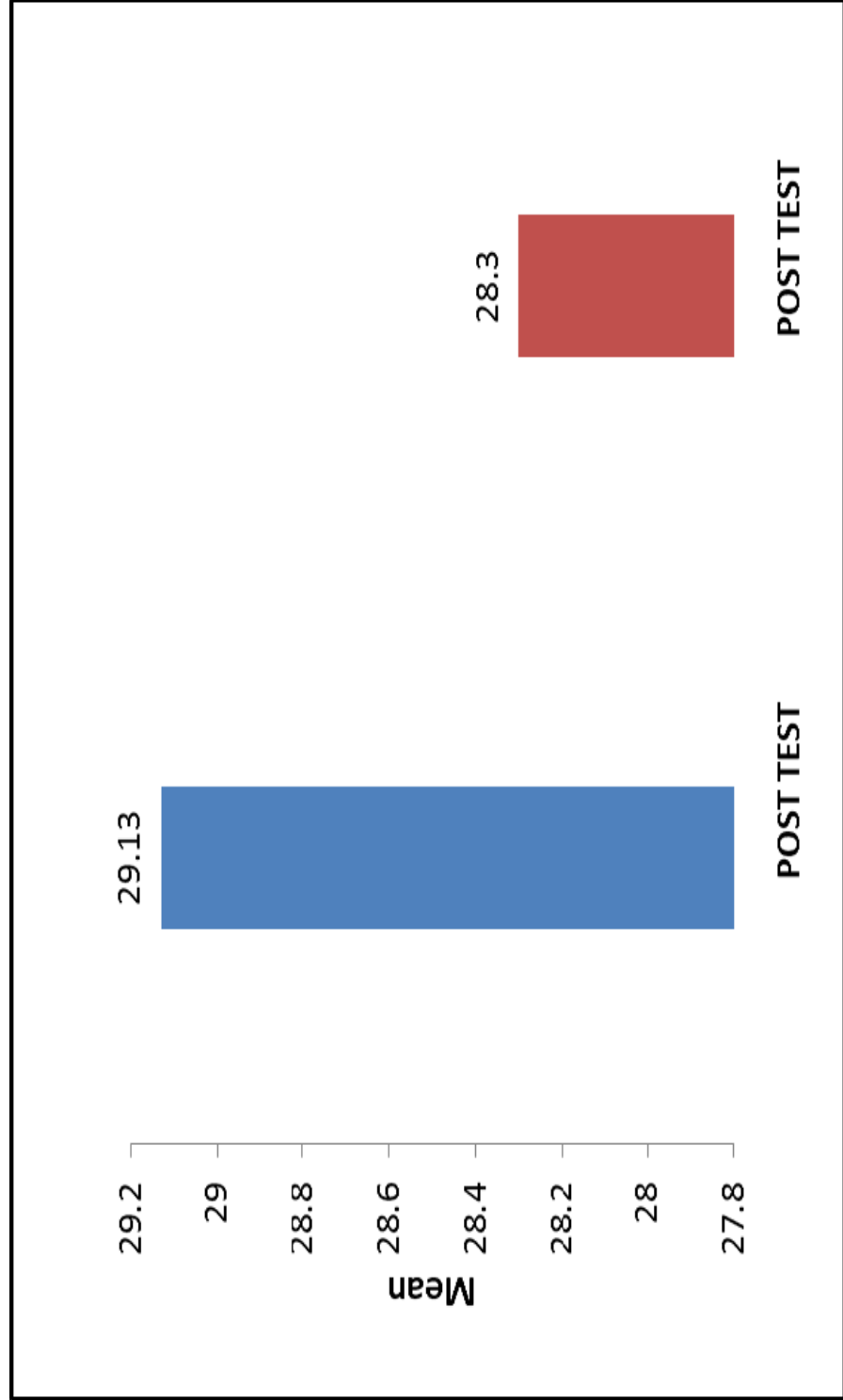


**TABLE- IV****2. Range of motion**

<b>subject</b>	<b>Sustained natural apophyseal glide Vs sustained natural apophyseal glide with chin tuck exercise</b>	
	<b>Group A</b>	<b>Group B</b>
Posttest mean	29.13	28.3
Independent 't' test	1.0853	

The independent t test value for range of motion, 1.0853 is respectively for 28 degree of freedom at 0.05 level of significance and critical table value is 2.048, therefore there is no significant difference in both the group

**INDEPENDENT t TEST**  
**GRAPH- VI**  
**RANGE OF MOTION (Group A and Group B)**



## INTERPRETATION OF DATA

1. Calculated value of paired 't' test for group A (Pain) = 13.823
2. Calculated value of paired 't' test for group B (Pain) = 21.299
3. Calculated value of paired 't' test for group A (range of motion) = 15.370
4. Calculated value of paired 't' test for group B (range of motion) = 17.692
5. Calculated value of independent 't' test for pain = 1.0064
6. Calculated value of independent 't' test for range of motion = 1.0853

## 5. RESULT

The pretest and posttest value of the groups were analyzed using paired t test and independent t test.

In group A, the mean visual analogue scale pretest value was 7.8 and posttest value was 4.2 for 14 degree of freedom at 0.05 level of significance, the t table value is 2.145 and T calculated value is 13.823 which is greater than t value.

In group B, the mean visual analogue scale pretest value was 6.8 and posttest value was 2.86 for 14 degree of freedom at 0.05 level of significance, the t table value is 2.145 and T calculated value is 21.299 which is greater than t value.

In group A, the mean cervical flexion rotation range of motion pre test value was 26.13 and posttest value was 29.13 for 14 degree of freedom at 0.05 level of significance, the t table value is 2.145 and T calculated value is 15.370 which is greater than t value.

In group B, the mean cervical flexion rotation range of motion pre test value was 25.6 and post test value was 28.3 for 14 degree of freedom at 0.05 level of significance, the t table value is 2.145 and T calculated value is 17.692 which is greater than t value.

The independent t test values for pain, 1.0064 is respectively for 28 degree of freedom at 0.05 level of significance and critical table value is 2.048, therefore there is no significant difference in both the group.

The independent t test values for range of motion, 1.0853 is respectively for 28 degree of freedom at 0.05 level of significance and critical table value is 2.048, therefore there is no significant difference in both the group.

From this study we are accepting null hypothesis and rejecting alternate hypothesis.

## **6. DISCUSSION**

Reduction in pain intensity was significant in both the groups (sustained natural apophyseal glide, chin tuck with sustained natural apophyseal glide). Pain relief in both the group occurred due to correction of positional fault and reduced stress in neck structures.

Restricted flexion rotation range of motion is one of the cause for cervicogenic headache. The application of sustained natural apophyseal glide and chin tuck along with sustained natural apophyseal glide facilitated the increase in range of motion.

There was statistically significant improvement in cervical flexion rotation range of motion and decrease in pain on last day of treatment in both the group, but there was no significant difference between the groups.

## **7. SUGGESTION**

- The study can be done in large samples
- Study can be carried out for longer period of duration
- It can be applied for patient with neck pain and stiffness with no arm movement
- Can be applied for low back pain due to lumbar joint involvement
- Control group can be added

## **LIMITATION**

- The study was done for a short span
- This study was applied for age group 20 -59 years
- This study was done only on patient with positive flexion rotation test



## **8. CONCLUSION**

The study was conducted with an aim to compare the effectiveness of sustained natural apophyseal glide and sustained natural apophyseal glide along with chin tuck exercise. Both these interventions are useful in treating cervicogenic headache in concern of pain and increase in cervical flexion rotation range of motion. Thus it was concluded that there was significant decrease in pain and increase in cervical flexion rotation range of motion in both the group. But there was no significant difference between the groups.

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## 10. APPENDICES

### APPENDIX - I

TABLE- - I

Group A [pain]

VISUAL ANALOGUE PAIN SCALE		
SNO	PRE TEST	POST TEST
1	8	5
2	9	5
3	8	4
4	8	5
5	8	4
6	7	3
7	8	5
8	8	4
9	7	3
10	8	5
11	7	3
12	7	3
13	7	5
14	9	5
15	8	4

**TABLE- - II**

**Group B [pain]**

<b>VISUAL ANALOGUE PAIN SCALE</b>		
<b>SNO</b>	<b>PRE TEST</b>	<b>POST TEST</b>
1	8	5
2	7	3
3	6	2
4	7	3
5	6	2
6	5	1
7	6	2
8	7	2
9	8	3
10	7	2
11	7	2
12	8	3
13	6	2
14	7	2
15	7	1

**TABLE- - III****Group A [Rom]**

<b>RANGE OF MOTION</b>		
<b>SNO</b>	<b>PRE TEST</b>	<b>POST TEST</b>
1	28 <sup>0</sup>	30 <sup>0</sup>
2	25 <sup>0</sup>	29 <sup>0</sup>
3	26 <sup>0</sup>	28 <sup>0</sup>
4	28 <sup>0</sup>	30 <sup>0</sup>
5	29 <sup>0</sup>	31 <sup>0</sup>
6	23 <sup>0</sup>	26 <sup>0</sup>
7	24 <sup>0</sup>	28 <sup>0</sup>
8	22 <sup>0</sup>	25 <sup>0</sup>
9	21 <sup>0</sup>	25 <sup>0</sup>
10	27 <sup>0</sup>	30 <sup>0</sup>
11	28 <sup>0</sup>	32 <sup>0</sup>
12	28 <sup>0</sup>	31 <sup>0</sup>
13	25 <sup>0</sup>	28 <sup>0</sup>
14	26 <sup>0</sup>	29 <sup>0</sup>
15	32 <sup>0</sup>	35 <sup>0</sup>

**TABLE- - IV**

**Group B [Rom]**

<b>RANGE OF MOTION</b>		
<b>SNO</b>	<b>PRE TEST</b>	<b>POST TEST</b>
1	23 <sup>0</sup>	26 <sup>0</sup>
2	27 <sup>0</sup>	29 <sup>0</sup>
3	26 <sup>0</sup>	28 <sup>0</sup>
4	28 <sup>0</sup>	31 <sup>0</sup>
5	25 <sup>0</sup>	28 <sup>0</sup>
6	22 <sup>0</sup>	25 <sup>0</sup>
7	25 <sup>0</sup>	29 <sup>0</sup>
8	29 <sup>0</sup>	31 <sup>0</sup>
9	29 <sup>0</sup>	31 <sup>0</sup>
10	30 <sup>0</sup>	33 <sup>0</sup>
11	26 <sup>0</sup>	29 <sup>0</sup>
12	24 <sup>0</sup>	27 <sup>0</sup>
13	23 <sup>0</sup>	25 <sup>0</sup>
14	25 <sup>0</sup>	28 <sup>0</sup>
15	22 <sup>0</sup>	25 <sup>0</sup>

## APPENDIX II

### ASSESSMENT FORMAT

#### Subjective assessment

- Name
- Age
- Sex
- Occupation
- Chief complaints
- History of illness
  - a) Present history
  - b) Past medical history
  - c) Personal history
- Associated medical problems
- Pain assessment
  - Duration
  - Onset
  - Frequency
  - Nature of pain



- Aggravating factors

- Relieving factors

- Intensity

- Vital signs

- Temperature

- Blood pressure

- Pulse rate

- Respiratory rate

## **Objective assessment**

### **On observation**

- Built of patient

- Posture

- Structural abnormality

### **On palpation**

- Tenderness around neck region

- Spasm

### **On examination**

- Cervical flexion rotation ROM using goniometer

## **Differential diagnosis**

## **Management**

- Aims
- Means
- Follow up

## **PATIENT CONSENT FORM**

I \_\_\_\_\_ voluntarily consent to participate in  
the research named

**“A COMPARATIVE STUDY ON EFFECTIVENESS OF SUSTAINED  
NATURAL APOPHYSEAL GLIDE OVER SUSTAINED NATURAL  
APOPHYSEAL GLIDE WITH CHIN TUCK EXERCISE IN CERVICOGENIC  
HEADACHE”**

The researcher has explained me the treatment approach in brief, risk of  
participation and has answered the questions related to the study to my satisfaction.

Signature of Participant :

Signature of the Witness :

Signature of Researcher :

Date :

Place :